



SPEED OPTIMIZATION SYSTEM

AUTOPILOT FOR MAXIMUM PRODUCTION RATE AT HIGH MATERIAL QUALITY LEVEL

Several highly talented musicians are nothing without a good conductor. All the individual aggregates of a line must be coordinated together in order to get the best out of them.

CHALLENGE

Optimizing the whole production of a line starts with maximizing process speeds in all line sections, for example, by defining maximum pickling speeds for individual products, minimizing downtimes required for shearing and welding operations, and maximizing pass schedule rolling speeds, bearing in mind any technological restrictions.

Unfortunately, this is not enough. Depending on product properties, any one of these sections may be a bottleneck for a particular product. Since the critical aggregates (pickling section, tandem mill, ...) should operate at fairly constant speeds, a method of speed compensation between sections is necessary. Strip accumulators (loopers) accomplish this function but unfortunately they are not sufficient to guarantee a high throughput.

A conductor with a global overview is necessary to optimize the interaction of all the sections. The dynamic settings and the online management of the different aggregates is essential to optimize the line continuously.

OUR SOLUTION

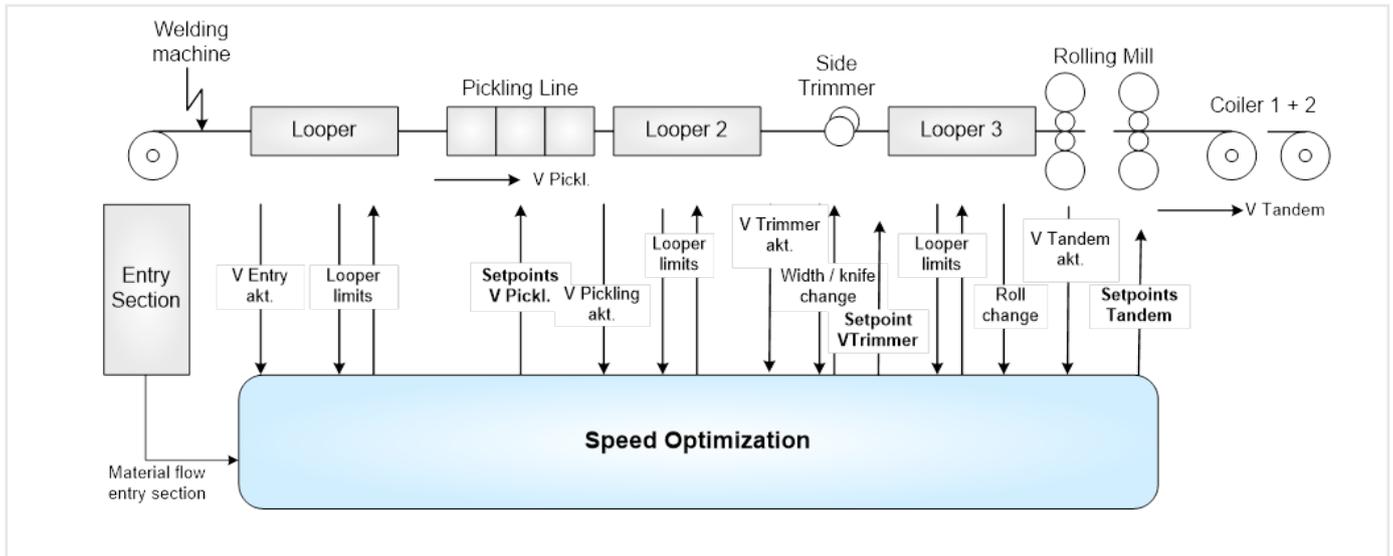
The aim of the Primetals Technologies Speed-Optimization-System is to run each part of the plant as fast as possible to increase throughput, while ensuring that the speed of each plant part is kept as constant as reasonable for quality reasons.

The essential objectives of the Speed Optimization System are constant speeds in critical aggregates (pickling section, tandem mill, ...) except where special speed profiles are required for weld passing and cutting.

In order to determine the best overall rolling strategy, the following constraints are considered:

- Maximum speed of each aggregate (plant limits or maximum speed for technological models)
- Individual acceleration/deceleration rates
- Available looper capacities
- Planned downtimes for coil change in the entry section and for width change at the side trimmer (if any)
- Individual speed characteristics of each aggregate (reduced pickling speed for the weld seam, cut speed for weld seam in the tandem mill (if any), ...)

The result is a process that is more homogeneous in operation, has products of higher quality and a maximized throughput.



Principle of speed optimization for PLTCM

PRODUCT FEATURES

The Speed Optimization System cyclically receives strip data from the basic automation (e.g. occupancy of the entry saddles, strips and remaining lengths at different reference points in the plant, ...) and measured values from the process (actual speeds, looper filling levels, ...).

Based on the actual values, limits, primary data and pre-calculated set points, the program calculates the optimum speed references for each strip and each aggregate of the line. With the cyclic measured values, the Speed Optimization System continually adapts these reference speeds according to the actual situation.

For optimizing purposes, all the major events are stored in a database. Later, an offline statistical evaluation is triggered to tune all the parameters, especially the downtimes since their correct estimation has a significant impact on the accuracy of the prediction

FIELDS OF APPLICATION

- Processing Lines
- Continuous Cold Rolling Mills

MAIN BENEFITS

- Higher yield - the whole process is optimized from the throughput point view, not only each individual aggregate
- Constant quality - ensures a high product quality by maintaining a constant speed in the critical aggregates
- Less unplanned stoppages- avoids stoppages in the critical aggregates of the line (pickling section, tandem mill, ...)
- Flexibility of the optimization strategy taking account of the steel grade features



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